REMARKS

Claims 13, 14, 16 through 21, 23 through 31, and 69 through 80 are currently pending in the application.

Applicant notes that the amendments to the claims presented in the Amendment dated October 11, 2004 were not entered due to a noncompliant identifier associated with claim 19. Accordingly, the amendments that were not entered as well as additional amendments are presented in detail hereinabove.

Particularly, claims 14, 17, 19, 24, 26, 70-72, 74, 75, and 78-80 have been amended. Support for each of the amendments to claims 70, 72, 74, and 75 is found in paragraph [0028] of the application. Applicant respectfully requests reconsideration of the application as amended herein.

Applicants note with appreciation the level of detail contained in the Advisory Action.

The Advisory Action indicates that the subject matter of claim 76 is allowable. Applicants note with appreciation the indication of allowable subject matter. Also, in the Office Action dated August 11, 2004, claim 77 was objected to as being dependent upon rejected base claims, but the indication of allowable subject matter in such claim is noted with appreciation.

Because the Advisory Action appears to indicate that rejections presented in the Office Action dated August 11, 2004 are maintained, the following discussion is organized according to such rejections.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 6,197,168 to Matsunaga et al. in view of U.S. Patent No. 4,704,985 to Rubenstein and U.S. Patent No. 2,488,195 to Ivey

Claims 13, 23 through 26, 29 through 31, and 73 through 75 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,197,168 to Matsunaga et al. (hereinafter "Matsunaga") in view of U.S. Patent No. 4,704,985 to Rubenstein (hereinafter "Rubinstein") and U.S. Patent No. 2,488,195 to Ivey (hereinafter "Ivey"). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the

> art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Applicants note that the Advisory Action apparently relies upon the motivation for conservation or reuse of material (nitrided metal particulate) for the motivation to combine Rubenstein with Ivey.

The Advisory Action indicates that one of ordinary skill in the art would be motivated to use a reduced air pressure zone proximate the spray gun for collecting a solidified, nitrided metal particulate generated by Matsunaga.

Further, the Advisory Action argues that there is a use for nitrided metal particulate. Applicant respectfully requests identification of at least one use known in the art that would motivate one of ordinary skill in the art to make the proposed combination.

Applicants also respectfully submit that no evidence has been provided that overspray *will* occur due to a spray method as taught by Matsunaga. Matsunaga does not teach or suggest that overspray occurs or is a problem whatsoever. Applicants respectfully assert that without the *presence* of overspray, one of ordinary skill in the art would not be motivated to make the proposed combination.

Moreover, even assuming, *arguendo*, that overspray would exist while performing a spraying process as taught by Matsunaga, Applicants respectfully submit that no evidence has been supplied that the proposed collection system (according to the combination of references) would have a reasonable expectation of success.

More specifically, Applicants agree that the nitrided metal particles, if any, that form overspray and that do not stick to the inside of the pipe may collect therein. However, even assuming that overspray exists in the spray method taught by Matsunaga, Applicants respectfully submit that neither the Advisory Action, nor any previous Office Action, has submitted any evidence that a reduced air pressure zone proximate the spray gun would exhibit a reasonable expectation of success for collecting nitrided metal particulate.

To the contrary, however, Applicants have identified several problems that weigh against

a reasonable expectation of success.

First and foremost, Matsunaga teaches an intricate and relatively complicated process for depositing the nitrided metal particulate on an interior of a pipe. Particularly, Matsunaga teaches that the molten metal particles 45 are carried by a high-speed stream of the cooled nitrogen-containing compressed gas in a supercooled state (i.e., in the molten state at a low temperature) when they are struck against the surface of the substrate 46, and piled on that surface to form a sprayed coating film of the metal nitride. *See generally* Column 17, lines 52-67; Column 18, lines 1-17.

Accordingly, Applicants respectfully assert that the mere assertion that a collection apparatus *could* be assembled for collecting nitrided metal particulate does not establish a reasonable expectation of success.

In specific detail, given a presence of a reduced air pressure zone proximate the spray gun would inexorably draw at least some of the nitrogen gas that is used for propelling and chemically nitriding the molten titanium.

In doing so, it would be apparent that, absent some additional teaching of Matsunaga, air containing oxygen, nitrogen, and other gases may enter into the pipe and may interact with the molten titanium. Such a configuration weighs *against* one of ordinary skill in the art making the proposed combination. No teaching or suggestion within Matsunaga addresses the technical problems associated with the proposed combination.

Additionally, a presence of a reduced air pressure zone proximate the spray gun inexorably drawing at least some of the nitrogen gas that is used for propelling and chemically nitriding the molten titanium would influence a velocity of the molten titanium particles. In turn, the deposition process will be altered and such alteration weighs against one of ordinary skill in the art making the proposed combination. No teaching or suggestion within Matsunaga addresses the technical problems associated with the proposed combination. Applicants respectfully assert that a reasonable expectation of success has not been established with respect to the velocity influences of a reduced air pressure zone proximate the spray gun in a process taught by Matsunaga.

As may be further appreciated by one of ordinary skill in the art, the process taught by Matsunaga generates a carefully tailored thermal environment which must be maintained for facilitating cooling of the molten titanium while allowing adhesion thereof to the pipe. A

presence of a reduced air pressure zone proximate the spray gun inexorably drawing at least some of the nitrogen gas that is used for propelling and chemically nitriding the molten titanium would influence the thermal environment during spraying of the molten titanium particles. In turn, the deposition process will be altered and such alteration weighs against one of ordinary skill in the art making the proposed combination. No teaching or suggestion within Matsunaga addresses the technical problems associated with the proposed combination. Applicants respectfully assert that a reasonable expectation of success has not been established with respect to the thermal influences of a reduced air pressure zone proximate the spray gun in a process taught by Matsunaga.

Further, Applicant respectfully submits that because the density of nitrided particulate is much greater than the density of (presumably atomized) paint taught by Ivey, there is no reasonable expectation that a reduced air pressure zone proximate the spray gun would be effective in collecting overspray, if any, in a spraying process as taught by Matsunaga.

Accordingly, Applicant respectfully submits that neither the Advisory Action, nor any previous Office Action, has submitted any evidence that a reduced air pressure zone proximate the spray gun would have a reasonable expectation of success for collecting nitrided metal particulate without interfering (e.g., thermally, chemically, or by forces generated by the reduced pressure) with the precise method of deposition that is taught by Matsunaga. Applicant respectfully submits that a reduced air pressure of a sufficient magnitude for collecting solidified nitrided metal particulate does not have a reasonable expectation of success in combination with the spray deposition method taught by Matsunaga.

Applicants respectfully assert that the only way one might find the present claims obvious is with impermissible hindsight from the disclosure of the present application. **Both the suggestion to make the claimed combination and a reasonable expectation of success must be founded in the prior art, not in applicants' disclosure**. In re Vaeck, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). That a prior art device could be modified to produce the claimed device does not justify an obviousness rejection unless the prior art suggested the modifications desirability. In re Gordon, 221 U.S.P.Q. 1125 (Fed. Cir. 1984).

Therefore, Applicant respectfully requests reconsideration and allowance of independent claim 13.

Each of dependent claims 23 through 26 is allowable as depending, either directly or

indirectly, from independent claim 13, which is allowable.

Applicants respectfully request reconsideration and allowance of each of dependent claims 23 through 26.

Dependent claim 29 recites, *inter alia*, "flushing the interior of the pipe with cooling air."

Applicants respectfully assert that none of the references teach or suggest all the claim limitations of dependent claim 30. The prior art reference (or references when combined) *must* teach or suggest *all* the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (Emphasis added); M.P.E.P. § 2143.03, stating "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Applicants respectfully assert that one of ordinary skill in the art would not be motivated to flush the interior of the drum as taught by Rubinstein. Particularly, Applicants respectfully submit that flushing the interior of the drum would likely propel overspray, if any, from the interior of the drum substantially directly through aperture 57 formed in wall 56, as shown in FIGS. 1 and 2 of Rubinstein. Such a condition would directly interfere with the objectives of the Rubinstein invention. Alternatively, because the cooling air is a source of gas the reduced pressure zone proximate to the spray gun will draw such cooling air. Accordingly, such drawing would influence a velocity of the molten titanium particles. In turn, the deposition process will be altered and such alteration weighs against one of ordinary skill in the art making the proposed combination. No teaching or suggestion within Matsunaga addresses the technical problems associated with the proposed combination. Applicants respectfully assert that a reasonable expectation of success has not been established with respect to the velocity influences of a reduced air pressure zone proximate the spray gun in combination with flushing the interior of the pipe with cooling air in conjunction with a spraying process as taught by Matsunaga.

Also, flushing the interior of a pipe with cooling air may influence nitriding of the metal particles as taught by Matsunaga. Additionally, flushing the interior of a pipe with cooling air may influence the thermal environment as taught by Matsunaga for successfully spraying and nitriding the molten metal particles. Applicants respectfully submit that overcoming the thermal, chemical, and velocity effects of flushing the interior of the pipe with cooling air are not taught or suggested by Matsunaga; thus, such considerations weight against one of ordinary skill in the art making the proposed combination.

Accordingly, Applicant respectfully submits that neither the Advisory Action, nor any previous Office Action, has submitted any evidence that flushing the interior of the pipe with cooling gas in combination with a reduced air pressure zone proximate the spray gun would have a reasonable expectation of success for collecting nitrided metal particulate without interfering (e.g., thermally, chemically, or by forces generated by the reduced pressure) with the precise method of deposition that is taught by Matsunaga. Applicant respectfully submits that such a configuration does not have a reasonable expectation of success in combination with the spray deposition method taught by Matsunaga.

Therefore, Applicants respectfully assert that one of ordinary skill in the art would not be motivated to flush the interior of a pipe with cooling air. Thus, Applicants respectfully assert that dependent claim 29 is allowable.

In addition, dependent claim 29 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 29.

Dependent claim 30 recites, *inter alia*, "directing the cooling air into the interior of the pipe from at least one cooling air outlet disposed on the extension arm."

Applicants respectfully assert that none of the references teach or suggest all the claim limitations of dependent claim 30. The prior art reference (or references when combined) *must* teach or suggest *all* the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (Emphasis added); M.P.E.P. § 2143.03, stating "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Therefore, Applicants respectfully assert that dependent claim 30 is allowable.

Also, dependent claim 30 is allowable as depending from independent claim 13, which is allowable.

Accordingly, Applicants respectfully request reconsideration and allowance of dependent claim 30.

Applicants respectfully assert that dependent claim 31 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of dependent

claim 31.

Also, dependent claim 73 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 73.

Further, dependent claim 74, as presently amended, recites, *inter alia*, "utilizing a sensor to measure a position of the spray gun in relation to the interior surface of the pipe while spraying the conductive material."

Applicants respectfully assert that none of the references teach or suggest all the claim limitations of dependent claim 74. The prior art reference (or references when combined) *must* teach or suggest *all* the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (Emphasis added); M.P.E.P. § 2143.03, stating "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Therefore, Applicants respectfully assert that dependent claim 74 is allowable.

Also, dependent claim 74 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 74.

Dependent claim 75, as presently amended, recites, *inter alia*, "utilizing a sensor to measure a thickness of the conductive material while spraying the conductive material."

Applicants respectfully assert that none of the references teach or suggest all the claim limitations of dependent claim 75. The prior art reference (or references when combined) *must* teach or suggest *all* the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (Emphasis added); M.P.E.P. § 2143.03, stating "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Therefore, Applicants respectfully assert that dependent claim 75 is allowable.

Also, dependent claim 75 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of dependent

claim 75.

Obviousness Rejection Based on U.S. Patent No. 6,197,168 to Matsunaga et al. in view of U.S. Patent No. 4,704,985 to Rubenstein and U.S. Patent No. 2,488,195 to Ivey, as applied to claim 13 above, and further in view of U.S. Patent No. 5,024,423 to Matsumoto et al.

Claims 14, 16 through 19, 69 through 72, and 78 through 80 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,197,168 to Matsunaga et al. in view of U.S. Patent No. 4,704,985 to Rubenstein et al. and U.S. Patent No. 2,488,195 to Ivey, as applied to claim 13 above, and further in view of U.S. Patent No. 5,024,423 to Matsumoto et al. (hereinafter "Matsumoto"). Applicants respectfully traverse this rejection, as hereinafter set forth.

With respect to claim 14, the Advisory Action indicates that because plasma spraying is an art-recognized means for depositing the insulating materials disclosed by Matsunaga, it would have been obvious to one of ordinary skill in the art. In the previous Office Action, it was asserted that one of ordinary skill in the art would have deposited insulating material by way of a spray gun because the overall process would be greatly simplified—implying that both the conductive material and the insulative material could be deposited by the spraying apparatus taught by Matsunaga.

As pointed out in the previous Amendment, Applicants respectfully assert that the spray gun taught by Matsunaga would not be capable of spraying an electrically insulating material, such as alumina, for at least two reasons. First, the bends within the spray gun 31 taught by Matsunaga would cause a brittle material, such as a ceramic material, to fracture. Second, an insulative material is, by definition, not electrically conductive. Therefore, the polarities imparted to the feed material, as taught by Matsunaga, would be useless for creating an arc as taught by Matsunaga.

Applicants respectfully assert that such a combination does not possess a reasonable expectation of success.

Accordingly, is apparent that the spraying apparatus taught by Matsunaga is unsuitable for spraying insulative material. Accordingly, as taught by Matsunaga, one of ordinary skill in the art would not deposit insulative material by spraying. Further, since the motivation for simplifying the overall process is not viable, Applicant submits that there is no motivation

identified by the Examiner for combination of the references so as to spray the insulative material because such a configuration would complicate rather than simplify a method for coating both a conductive and an insulative material on an interior of a pipe.

Also, dependent claim 14 is allowable as depending from independent claim 13, which is allowable.

Accordingly, Applicants respectfully request reconsideration and allowance of dependent claim 14.

Each of dependent claims 16, 17, 18, 19, and 69 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of each of dependent claims 16, 17, 18, 19, and 69.

Dependent claim 70, as presently amended, recites, *inter alia*, "measuring a position of the spray gun in relation to the interior surface of the pipe with a sensor while spraying the insulative material."

Applicants respectfully submit that the references teach or suggest measuring a position of the spray gun in relation to the interior surface of the pipe with a sensor while spraying the insulative material.

Additionally, dependent claim 70 is allowable as depending from independent claim 13, which is allowable.

Applicants respectfully request reconsideration and allowance of dependent claim 70.

Dependent claim 71 recites, *inter alia*, "controlling the position of the spray gun in relation to the interior surface of the pipe responsive to measuring the position."

Furthermore, Applicants further assert that one of ordinary skill in the art would not pursue controlling the position of the spray gun responsive to measuring the position with respect to the apparatus taught and suggested by Rubinstein.

Foremost, the position of the spray gun relative to the interior of a hollow article would be determined according to the lengths, configuration, and particular position of the components of the moveable frame. *See* FIGS. 1 and 2. Thus, Rubinstein appears to teach away from controlling the position of the spray gun responsive to measuring the position, since the position of a spray gun mounted to a lance structure as taught by Rubinstein would have a predetermined position in relation to a surface of a pipe based upon the lengths, configuration, and particular

position of the components of the moveable frame. Put another way, controlling the position of the spray gun responsive to measuring the position would be incompatible with the apparatus of Rubinstein, because the position of the spray gun has a predetermined position in relation to the pipe.

In addition, dependent claim 71 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 71.

Dependent claim 72 is allowable as depending from independent claim 13, which is allowable. Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 72.

Dependent claim 78 is allowable as depending from independent claim 13, which is allowable. Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 78.

Dependent claim 79 recites, *inter alia*, "forming each of the plurality of conductive traces upon the insulative layer."

Applicants respectfully assert that none of the references teach or suggest all the claim limitations of dependent claim 79. The prior art reference (or references when combined) *must* teach or suggest *all* the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (Emphasis added); M.P.E.P. § 2143.03, stating "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Also, dependent claim 79 is allowable as depending from independent claim 13, which is allowable. Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 79.

Dependent claim 80 recites, *inter alia*, "forming a plurality of separate insulative layer segments" and "forming a respective one of the plurality of conductive traces onto each of the plurality of separate insulative layer segments."

Applicants respectfully assert that none of the references teach or suggest all the claim limitations of dependent claim 80.

Also, dependent claim 80 is allowable as depending from independent claim 13, which is allowable. Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 80.

Obviousness Rejection Based on U.S. Patent No. 6,197,168 to Matsunaga et al. in view of U.S. Patent No. 4,704,985 to Rubenstein, U.S. Patent No. 2,488,195 to Ivey and U.S. Patent No. 5,024,423 to Matsumoto et al., as applied to claim 19 above, and further in view of U.S. Patent No. 3,740,522 to Muehlberger

Claims 20 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsunaga et al. (U.S. Patent No. 6,197,168) in view of Rubenstein et al. (U.S. Patent No. 4,704,985), Ivey (U.S. Patent No. 2,488,195) and Matsumoto et al. (U.S. Patent No. 5,024,423), as applied to claim 19 above, and further in view of Muehlberger (U.S. Patent No. 3,740,522). Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants respectfully assert that portions of the references that do not support the motivation to combine cannot be dismissed by relying exclusively upon an isolated teaching or suggestion found within one of the references.

Rather, the patentability standard for a case of obviousness requires that a reference be considered as a whole. "Portions arguing against or teaching away from the claimed invention must be considered." Bausch & Lomb, Inc. v. BarnesHind/Hydrocurve, Inc., 230 USPQ 416 (Fed. Cir. 1986). A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 220 U.S.P.Q. 303 (Fed. Cir. 1983), *see also* M.P.E.P. § 2141.02.

Accordingly, Applicants respectfully assert that the combination of the 5 (five) references is untenable for at least the reasons discussed hereinabove.

Further, dependent claim 20 is allowable as depending from independent claim 13, which is allowable. Applicants respectfully request reconsideration and allowance of dependent claim 20.

Dependent claim 21 recites, *inter alia*, "cooling the extension arm separately from the thermal spray gun."

The prior art reference (or references when combined) *must* teach or suggest *all* the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (Emphasis added);

M.P.E.P. § 2143.03, stating "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Applicants respectfully submit that none of the cited references explicitly state separately cooling the extension arm; therefore, Applicants respectfully submit that claim 21 is allowable.

Also, dependent claim 21 is allowable as depending from independent claim 13, which is allowable.

Accordingly, Applicants respectfully request reconsideration and allowance of dependent claim 21.

Obviousness Rejection Based on U.S. Patent No. 6,197,168 to Matsunaga et al. in view of U.S. Patent No. 4,704,985 to Rubenstein and U.S. Patent No. 2,488,195 to Ivey, as applied to claim 19 above, and further in view of U.S. Patent No. 3,740,522 to Muehlberger

Claims 27 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsunaga et al. (U.S. Patent No. 6,197,168) in view of Rubenstein et al. (U.S. Patent No. 4,704,985) and Ivey (U.S. Patent No. 2,488,195), as applied to claim 19 above, and further in view of Muehlberger (U.S. Patent No. 3,740,522). Applicants respectfully traverse this rejection, as hereinafter set forth.

Dependent claim 27 is allowable as depending from independent claim 13, which is allowable.

Therefore, Applicants respectfully request reconsideration and allowance of dependent claim 27.

Dependent claim 28 recites, *inter alia*, "cooling the extension arm separately from the thermal spray gun."

Applicants respectfully submit that none of the cited references explicitly state separately cooling the extension arm; therefore, Applicants respectfully submit that claim 27 is allowable.

Dependent claim 28 is allowable as depending from independent claim 13, which is allowable. Accordingly, Applicants respectfully request reconsideration and allowance of dependent claim 28.

ENTRY OF AMENDMENTS

The amendments to claims 14, 17, 19, 24, 26, 70-72, 74, 75, and 78-80 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings.

CONCLUSION

Claims 13, 14, 16 through 21, 23 through 31, and 69 through 80 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,

Stephen R. Christian
Registration No. 32,687
Attorney for Applicants
P.O. Box 1625
Idaho Falls, ID 83415-3899
Phone: (208) 526-9140
Fax: (208) 526-8339

Date: 24 JAN 05